

# AMERICAN RAILROAD JOURNAL,

AND  
ADVOCATE OF INTERNAL IMPROVEMENTS.

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D. K. MINOR, and  
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                                  { PROPRIETORS. }

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## AMERICAN RAILROAD JOURNAL.

NEW-YORK, JANUARY 20, 1838.

OHIO RAILROAD REPORT.—R. HIGHAM,  
ENGINEER.

Engineer's Office.

To the President and Directors of the Ohio Railroad Co.

GENTLEMEN,—I have the honor herewith to present the Maps, Plans and Estimates for the proposed Ohio Railroad, beginning at the western boundary line of the State of Pennsylvania, and extending westwardly to the Maumee river in the State of Ohio, a distance of 177 miles.

The several red lines on the maps, are those that have been minutely examined and surveyed; they embrace a large extent of country, and afford sufficient data, to determine the general route the road should pursue.

Of the several routes surveyed, that passing through the towns bordering upon the Lake, presents the least formidable obstacles, and has the most favorable grades. The whole of this route can be traversed by locomotive engines, with a small diminution of their greatest effective power, as the *greatest* inclination does not exceed 16 feet per mile, and only a small proportion even of that elevation. This route, commencing at the Pennsylvania line and extending to the Conneaut Creek, was surveyed with a view of connecting the road with the Pennsylvania Railroad, and can be changed between these points to meet that road when located.

From Conneaut Creek to the township of Perry, a distance of 34 miles, the line passes over a country highly favorable for the construction of a Railroad. The greatest embankment or excavation will not exceed 4 feet, except in crossing Ashtabula river, and some small streams. At this point, in the township of Perry, the line diverges, and three lines of about the same feasibility offer:—two of which

pass through Fairport and Richmond, and the other through Painesville. The adoption of either of these lines will be a matter for your further consideration, at the final location of the road, when a detailed estimate for each will be submitted. These several lines again unite near the village of Willoughby.

Between Willoughby and Lower Sandusky, the line passes through the city of Cleveland, Ohio City, Charleston, Vermilion, Huron, and Sandusky city. The only difficulty throughout will be the great elevation at which we shall be compelled from the surface of the country to cross some of the rivers flowing northwardly into Lake Erie.

From Lower Sandusky to the Maumee river, the routes to the several towns on the river, from Perrysburgh to Manhattan, are about equal both in grades and expense; the route to the point which shall be deemed the most advantageous termination of the road, can be selected without fear of an additional expense of grading.

The South route from Ohio City to Lower Sandusky, through the townships of Olmstead, Elyria, Norwalk, Ridgefield, &c., would be considered in ordinary circumstances a very favorable one; but in comparison with the northern route, there is a great difference in favour of the latter, both in point of grading and in the amount of work.

For ease of grades, and proportion of straight lines to curves, perhaps no section of country can be selected more favorable than this route, for the construction of a Railroad. The whole distance from Pennsylvania to the Maumee river being 177 miles, of which 171½ miles are straight lines, and 5½ miles of curves, or about one mile of curved line to 31 miles of straight lines. Of these lines, one is 40 miles in length, another one of 28 miles, four others of 15 miles each, and others from 5 to 10 miles in length.

The grades are short, and are laid to suit the construction of the country. All heavy excavations and embankments have been avoided. The greatest inclination in any one mile is 16 feet, and this may be reduced to 10 feet per mile, and all the other inclinations nearly to a level, with a very small additional expense.

Aggregate length of lines, with	
Level Grades,	40 miles.
Do. do. with grades from level	
to 7 ft. per mile,	109 "
Do. do. with grades from 7 to	
10 ft. per mile,	17 "
Do. do. with grades from 10 to	
15 ft per mile,	11 "

177 miles.

The following estimate of the probable cost of the road graded for a double track, with a single track laid the whole distance, the necessary turnouts, machinery and buildings, has been made with great care, and I feel confident will be found abundant to complete the work. The superstructure is contemplated to be of the usual form used in the States of New-York and New-Jersey (see plan and Estimate No. 1) having a rail plate of twenty-five tons to the mile. The graded surface to be twenty-four feet wide in embankments, and thirty-six feet in excavations, with a slope of one and a half horizontal to one vertical, having the proper ditches through the excavation. The large streams and valleys are estimated to be passed by wooden viaducts. In those that are of importance, the timber and framing to be completely protected from the weather, the small ones will be built in a simple form as per plan, and can be replaced when decaying, by earth embankments, and stone arches, which with the facility afforded by the road for conveying materials, can be done with less expense than at present.

No allowance has been made in the estimates for the purchase of lands and cost of fencing, nor for grubbing and clearing. The general disposition of the proprietors of the lands on the line to release it, and make their fences, and also the powers granted in the Charter to take the lands, and have the advantages offset against the damages, together with the liberal donations of land, and the enlightened views entertained by the mass of the inhabitants through whose land the road passes, will warrant us in omitting this usually heavy item in the construction of public works.

The light timber on the line, may be cut into steamboat wood, for which there is a great and increasing demand, and the oak and other building timber will find a ready market, in the progress of



the work, and will yield more than sufficient to pay all the expense of grubbing and clearing.

The general character of the soil, on the line of the road, is gravel, loam, sand, and alluvial deposit, and throughout the line no rocky or other hard material is found. The earth from the slight excavations, is to be carried into the embankments; when there is not sufficient earth from the cuttings to form embankments, they are to be formed by widening and deepening the ditches on the sides of the road; and where a surplus of earth is taken from the excavations, it is to be wheeled into the spoiled banks contiguous thereto. There are but few excavations where the earth will have to be carried more than five hundred feet. In all cases, both the excavations and embankments have been estimated, so that the price per yard is abundant to meet any contingencies of extra hauling.

An even and level road, for the safe and speedy transportation of passengers and freight—besides the economy in wear and tear of machinery—is of the first importance, and can only be attained through the flat country, by properly draining and elevating the road. With this view, the grades, generally have been elevated about two feet above the surface of the ground, by which means we shall be able to have a dry road upon which the frost will have but little effect, and from which the light snows will be blown off, and the deep ones easily removed.

## ESTIMATE.

1,230,164 cubic yards of excavation at 10 c.	\$123,016 40
2,873,889 c. y. of embankment, at 11 c.	316,127 79
	<hr/> 439,144 19

197, 3 feet drains, (see estimate A.) at \$63,	12,411 00
28, 5 feet culverts, (see estimate B.) at \$157,	4,386 00
5, 10 culverts, (see estimate C.) at \$361	1,805 00
	<hr/> 18,602 00

Bridge over Conneaut River,	18,750 00
do. over Ashtabula R.	32,290 00
do. over Grand River,	16,000 00
do. over Chagrin Riv.	8,200 00
do. over Cuyahoga R.	38,800 00
do. over Walworth Run,	10,500 00
do. over Rocky River,	20,000 00
do. over Black River,	10,800 00
do. over Vermilion Riv.	7,200 00
do. over Huron River,	6,600 00
do. over Sandusky R.	39,000 00
do. over Portage River,	4,200 00
16,100 Lineal ft. of Bridge over the marshes, ravines and small streams, at \$4 per lineal foot,	64,400 00
	<hr/> 276,740 00

708 crossing places for farms and roads, at \$10,	7,080 00
177 miles of superstructure at \$3,832 per mile, as per estimate D.	678,264 00
12 Locomotive Engines, at \$7,000	84,000 00
20 Lar. Cars, at \$1,600,	32,000 00
20 Sm. cars, at \$1,000,	20,000 00
100 Fr. Cars, at \$400,	40,000 00
	<hr/> 176,000 00
Depot buildings, water stations, &c.	100,000 00
Engineering and superintending,	100,000 00
	<hr/> 1,795,830 19
Add 10 per cent for contingencies,	179,583 01
	<hr/> Total, \$1,975,413 20

Or, \$11,160 52 per mile graded for a double track, with a single track laid.

Or, \$14,992 52 per mile for a double track complete.

Total for a double track, machinery, buildings, &c. complete, \$2,653,676.

To those that are acquainted with the country through which the line passes, and have examined into its merits, the facility it will give to the great mass of travellers that are daily thronging to the west and east, through Ohio, it would be superfluous to say more, than that the route is a feasible one, and can be built at reasonable expense; but to those who have not examined into the merits of this work, it may not be unimportant to give some general statements of its local advantages, to draw their attention to the subject, that it may be investigated by every one interested, when, I am confident they will come to the same conclusion that the projectors and friends of the road have, that is—that it will be one of the most important roads to the public, and the most profitable to its stockholders, of any in the Union, being a connecting link between all the great thoroughfares from the Eastern States to Lake Michigan, and the great South-western Rivers and States.

By referring to the map of the United States, and examining the routes of improvements completed and in contemplation, it will be seen, that both from the east and from the west, they all concentrate and unite with this road; from Maine to Virginia on the east and south, and from Lake Superior to Arkansas on the west.

Through half the year when the navigation of the Lakes is obstructed with ice, this must be the traveller's only route; and the saving of time, the safe and regular transit by Railroad, must secure through the remainder of the season a large proportion of travel.

When we compare the delays, damages and accidents incident to Lake navigation, the high and fluctuating prices of freight and insurance; with the safe, rapid and

regular transit at all seasons, and the regular prices of freight, by Railroad, Lake Erie will hardly be considered a rival communication for passengers, merchandise and light freight.

South of the table land (on which the Ohio Railroad is located) to the Ohio River, the country is broken with mountain ridges, dividing the waters flowing north and south, and raising impassable barriers to a parallel route.

The following roads and canals connect through this road the fertile regions of the west and the commercial cities of the Atlantic. On the east it receives the travel:

1st. From Boston to Albany by Railroad, the Erie Canal, and the Railroads through the same valley to Buffalo; from Buffalo by the Buffalo and Erie Railroad.

2d. From New-York city to Albany, and thence by the same route as No. 1.

3d. From New-York city by the New York and Erie Railroad to its intersection with the Buffalo and Erie road, thence by the Erie road to the Ohio Railroad.

4th. From Philadelphia, by Canals and Railroad, to Erie, thence by the Erie, to the Ohio Railroad.

5th. From Philadelphia, by Canals and Railroads, to Pittsburg, and thence to the Ohio Railroad, either by the Conneaut and Beaver Railroad, the Ashtabula and Liverpool Railroad, or the Pittsburg, Warren and Cleveland Railroad.

6th. From Baltimore, by the Baltimore and Ohio Railroad, the Wheeling and Wellsville Railroad, and the Wellsville and Fairport Railroad.

On the west the road receives the travel:

1st. From the Ohio River, by the Mad River Railroad.

2d. From Missouri and Illinois, by the Terra Haut and Alton Railroad, and the Peoria and Logansport Railroad, through the Wabash and Erie Canal and Railroad.

3d. From Chicago, through the Wabash and Erie Canal.

4th. From Evansville and Indianapolis by Railroad, and Wabash and Erie Canal.

5th. From Evansville, by the Indiana, and the Wabash and Erie Canals.

6th. From Lake Michigan, by the Erie and Kalamazoo Railroad.

7th. From Detroit, by the Detroit, Monroe, Huron and Manhattan Railroad.

Some idea of the business of this road may be formed from the following statement of the amount of business done on Lake Erie, a large portion of which will be drawn to this road. There will be on the Lake the ensuing season:

52 Steamboats, whose aggregate tonnage amounts to	15,900 tons
3 Ships, whose aggregate tonnage amounts to	800
6 Brigs, whose aggregate tonnage amounts to	1,046
150 Schooners and Sloops, whose aggregate tonnage amounts to	13,800
211 Vessels.	<hr/> Total, 31,546 tons



One hundred and fifty-nine sail vessels.  
Fifty-two steamboats.

From the records kept at Buffalo, the average number of arrivals and clearances for sail vessels, will be for each vessel thirteen. The average tonnage of said vessels is ninety-eight tons.

The steamboat clearances and arrivals at Buffalo will average forty-one for each boat. The average tonnage for steam-vessels is three hundred and five tons.

This will give for sail vessels 202,566 tons  
And for steam-vessels 650,260

Total, 852,826 tons

The navigation is usually open about two hundred days; this will give four thousand two hundred and sixty-four tons daily, that passes to and from the State of New-York, add to this the business from Pennsylvania and other sections, and the increase from the facilities given, together with the fact that the increase of travel has been above twenty per cent. per year for the last twenty years.

It is impossible to ascertain correctly the number of passengers that are passing east and west, but we can approximate something near it by estimating the number of arrivals and departures. The arrivals and departures of steamboats at Buffalo last season were one thousand six hundred and twenty, the traveling season two hundred and sixteen days, making a fraction short of eight boats per day. Allowing six of these boats to ply between Buffalo and Detroit and the intermediate places, and that each boat west has two hundred, and each boat east has one hundred passengers; which every one, who has seen the steamboats arrive and depart from Buffalo, will consider a very low estimate, besides the steamboats and sail vessels, there are two daily lines of stages from Buffalo west. From the above there would be by steamboats:

129,600 passengers going west.

64,800 do. do. east.

5,400 passengers going east and west by stage and sail vessels, 25 per day.

5,400 passengers going east and west by private conveyance.

29,800 passengers going east and west by private conveyance and stages the remainder of the year 149 days at 200 per day, making a total of 235,000 passengers.

I have consulted with a number of gentlemen who are well qualified from their commercial connection, to judge of the passengers passing east and west, and they are unanimous in the opinion that this is underrating the amount.

Without allowing for any increase of travel, and that one-half of the present will take the railroads, and putting the fare at \$5 for this 177 miles of road, it will

give,	\$587,500
100 tons of freight per day for 300 days—30,000 tons per year (which is one twenty-eighth of the tonnage on the Lake for Buffalo Harbor) at 2 cents per ton a mile,	106,800
Transporting United States mail per year,	20,000
	714,300
From this deduct for managing road and repairs, as per estimate D.	96,240
	\$618,060

Making a nett increase of 23 per cent. on \$2,654,000, the amount necessary to complete the road with a double track.

All of which is respectfully submitted by your obedient servant,

R. HIGHAM,

Engineer of the Ohio Railroad Company.

At a Meeting of the Board, it was resolved unanimously, That this Board fully appreciate the ability and zeal with which Mr. Higham has prosecuted these surveys, for which their thanks are hereby tendered; and from Mr. Higham's high professional standing, they have full confidence in his Report.

From the London Mechanics' Magazine.

LONDON AND BIRMINGHAM RAILWAY.—  
EIGHTH ANNUAL REPORT.

Birmingham, 18th August, 1837.

The directors on the present occasion of submitting their half-yearly report, have the satisfaction to announce, that the expectation they held out in their last Report of a partial opening of the line in the course of the present summer, to the extent of twenty-one miles out of London, has now been fully realized. Early in the month of July, the engineer having reported that the works of the twenty-four and a half miles, between the Company's station, at Euston-square, in London, and Boxmoor, were in a fit state for use, the directors decided that this portion of the railway should be opened to the public, on the 10th of that month. The trains commenced running accordingly on that day, and although the traffic has hitherto been merely derived from excursions of pleasure and curiosity, and from the journeys of the comparatively few individuals who reside in the immediate vicinity of the line, and although the departures of the trains (in consequence of the progress of the works connected with the entire completion, and finishing off, of this portion of the railway), are at present confined to three from each end, the number of passengers has already exceeded anticipation, and proved fully equal to the means for their conveyance.

On the 16th instant, being 28 days from the first opening, 39,855 persons had been conveyed by the railway, being an average of 1,423 per day, for which the daily receipts average 153*l*.; during

the last week the daily average of numbers has advanced to 1,807, and of receipts, to 189*l*.

The directors are assured by the engineer that the works which at present interfere with mid-day trains will be entirely completed, and that the whole of this part of the railway will be in excellent travelling order in the course of a month, by which time the stationary engine for the incline of the extension line will be in readiness for work, and an ample supply of locomotive engines at their command. Full effect will then be given to provisional arrangements, which have been already entered into with the principal coach proprietors, for bringing the passengers by their respective coaches upon the railway, as fast as it is in readiness to receive them, which arrangements, and others calculated to bring an immediate and active traffic upon the railway, all the parties concerned appear most anxious to carry on with spirit, whenever the directors feel satisfied that they are in a situation to perform punctually and efficiently what the company will then have to undertake.

The directors cannot but notice the great advantage arising from the gradual opening of successive portions of the railway; opportunity being thus afforded for organizing the arrangements required in the carrying department, and for progressively adapting them with the benefit derived from experience on a small scale, to more extended operations, whilst the road is becoming gradually and safely consolidated, and an important revenue is afforded by a limited number of passenger's trains.

The advance made towards the entire completion of all the works of the London and Birmingham railway, and the near approach of the time at which the whole line will be opened to the public, appear to the Directors to require, on their part, a communication to the proprietors of the most exact information which it is now in their power to obtain, as to the ultimate cost of the whole undertaking, the periods at which each portion of it may be reasonably expected to be opened for business, and the probable traffic. They have, in consequence, required from the engineer, carefully revised estimates of the cost of all the works in his department which are still unexecuted, and such a statement of the probable cost of those remaining works, of their entire sufficiency for the purposes of the traffic of all descriptions to be anticipated on opening the whole line, and of the exact periods at which, in all probability, each successive portion cannot now fail to be executed and completed, as he may be willing should go forth to the proprietors with the full sanction of his name and professional character.

The details will be annexed to the Report, and the directors cannot but remark with pleasure upon the assurance they have from Mr. Stephenson, at this



advanced period of the works, that not only will a few weeks see the railway at the London end, opened from Boxmoor to Tring (a further advance of seven miles), but that in the course of December next it will extend in perfect working order for business, sixteen miles farther, to Denbigh Hall, at the crossing of the Holyhead road, and at the Birmingham end as far as Rugby, making the whole length of railway which will be entirely completed, and which the directors therefore hope to have opened to the public on the first of January next, 27 miles. They have thus reasonable ground to hope that at this early period the entire line of railway communication between London, Birmingham, and the principal places in Lancashire, will be open to the public, with the exception only of an interval of thirty-five miles of excellent turnpike road between Rugby and Denbigh Hall. The engineer states that the proprietors may calculate with perfect confidence on the entire completion of the whole line, and of the works connected with it, in the course of the autumn of 1838.

The proprietors will see by the annexed revised estimates, that the expectation of the entire completion of the railway and stations in efficient working order from end to end, and of the ample carrying establishment now contracted for, within the capital of 4,500,000*l.*, is confirmed and strengthened by the further means of calculation afforded by the nearer approach of all the works to their termination. As far as relates to the cost of stations, engines, carriages, waggons, and, indeed, every item of future expenditure, excepting the unexecuted works in the engineering department, there is scarcely any opening for error or question, and the directors think that the confident manner in which Mr. Stephenson has expressed his conviction of the sufficiency in all respects of his present revised estimates (confirmed by the circumstance that works in the hands of the Company have been let, and executed by sub-contractors considerably below the engineer's estimate) affords every security and assurance of accuracy that can be obtained on this subject. It should also be mentioned, that no credit whatsoever is taken for a considerable extent of unoccupied land in possession of the Company for re-sale, as opportunities offer, and that the engineer's estimate for the carrying department includes a much larger extent of stock than will be required in the first instance, if at all. The directors, therefore, do not hesitate to express their confident expectation that the proprietors may calculate upon having the railway completed, and in full operation, within the present capital of 4,500,000*l.*, sanctioned by Parliament; and that if there should eventually prove to be any further excess in the engineering department, or if the extent of the future traffic should render expedient any extension of the works at

present contemplated, the additional capital cannot be required until a large revenue has rendered it easy of attainment, and placed the proprietors in a situation to judge of the propriety of such further outlay.

As the undertaking approached completion, the probable amount of traffic to be expected became a point of great interest. In order to obtain as near an approximation to truth as the circumstances of the case admit, a sub-committee was appointed to examine into the subject. The result of their investigations may be stated as follows:—

	Per Week.
That the gross receipt from passengers now travelling by coaches on the roads parallel immediately contiguous to the line of railway, without assuming any increase, amounts at railway prices to	£5,789
That the gross receipts from persons now posting on the same roads amount to	729
That the gross receipts from parcels now carried by coaches on the same roads amount to	1,571
That the gross receipts from goods now conveyed by waggons and canals on the lines between London and Birmingham, not including iron, timber, cattle, minerals, or other goods, which pay low tonnage, amount to	8,120
That the total gross receipts from the foregoing sources, assuming no increase, amount per week to	£47,209

That the total annual receipts amount to

£894,868

The data from which these results are obtained will be found in the Report to the Board by the sub-committee appointed to investigate the subject; copies of which document may be had by the proprietors, on application to the secretaries. The directors congratulate the proprietors upon the completion and opening for traffic of the Grand Junction Railway between the Liverpool and Manchester line and Vauxhall near Birmingham, and upon the commencement of the works of the Midland Counties and North Midland Railways, connecting the London and Birmingham line with Yorkshire and the Midland Counties; all which lines form tributary streams, the full value of which to the main trunk can scarcely be over estimated. The Birmingham and Gloucester, the Derby and Birmingham Railway Companies, appear to contemplate the use of the entrance into Birmingham and the stations of the London

and Birmingham Railway. The directors have the pleasure of communicating the entire success of the opposition announced in their last Report to the attempts to establish injurious rival lines, uncalled for by any public necessity. The judicious regulations now adopted by Parliament relative to all new lines of railway, afford ample grounds of security against the recurrence of projects of a similar description.

The directors have to announce, that the Act authorizing the Company to raise an additional million, and for other purposes, received the royal assent on the 30th June, and that in pursuance of the resolution of the special general meeting of the same date, an additional capital of 625,000*l.* has been created, under the powers of the Act, in 25,000 shares of 25*l.* each, which have been offered to the proprietors of 100*l.* shares, in the proportion of a 25*l.* share for each 100*l.* share. It is proposed that the new shares of 25*l.* each, which form an integral part of the capital stock of the Company, shall be entitled to the same rate of dividend as the original shares of 100*l.* each, without distinction as to the time of the payments of the calls which shall have been made respectively when a dividend is declared.

By the statements of accounts now to be laid before the proprietors, it will appear that—

The receipts to the 30th of June, were	£3,181,069 15 8
The disbursements,	3,102,292 8 5

And the balance of cash in the Company's hands at that date

78,797 7 3

The proprietors in referring to the account of capital, will observe, that there remains of the 4,500,000*l.* a sum of 1,329,282*l.* 17*s.* 3*d.* applicable to the further expenditure of the company, which, in the annexed estimate is stated at 1,313,698*l.*

R. CREED, } Secretaries of  
C. R. MOORSON, } the Board.

Engineer's estimate of the Periods at which different Portions of the Line will be completed.

From London to Boxmoor,	Miles. 24½	Open.
Boxmoor to Tring,	7½	" Oct. 1837.
Tring to Denbigh Hall,	32 } 16	" Jan. 1838
Birmingham to Rugby,	29 }	
Denbigh Hall to Blisworth,	77	
	13	" May, 1838.
Bilsworth to Rugby,	90	
	22½	" Autumn, 1838.
Total 112½ Miles.		



## IMPROVEMENTS IN THE ROYAL OBSERVATORY, GREENWICH.

Since the appointment of Professor Airy, as astronomer royal, various important improvements in this establishment have been effected, or put in a course of accomplishment.

In the first place, a large portion of the Royal Park has been enclosed, and annexed to the Observatory, for the purpose of magnetic observations; and there is every prospect, that such observations will be commenced in the course of the ensuing summer.

The library, as Professor Airy found it, contained the germs of a most valuable astronomical and mathematical collection; but almost every set of works continued in series was imperfect; and much was wanting in the modern works of continental astronomy. At the Professor's application, sums exceeding 200*l.* were placed at his disposal, by the Lords Commissioners of the Admiralty, for the completion of the library. Much has already been done; and before long, it is expected that the library will be made, without any great expense, a most valuable and practically useful collection. Mr. Airy attaches great importance to this part of the institution, for the following reason:—The natural tendency, in an office so much pressed with routine-work, and with official business having no very close relation to science, is, to be degraded into a mere bureau of clerks; and it is difficult even for the director to resist the contagion. The only antidote is, to place in the power of all, the means of acquaintance with the literature and the foreign systems of astronomy: to make the principal persons at least familiar with the speculations of ancient, and the theories of modern, times. It is only thus that the character of astronomer can be made to predominate over that of mere observer or mere calculator.

The only changes which might have been made in the instruments of the Observatory are the following:—The attachment of the telescope on Troughton's circle has been altered, the connexion being now effected by clamps similar to those used on Jones's circle and on the Cambridge circle, instead of the grasp of the spokes by which the telescope had been held in the same position for several years. The acting part of the zenith tube has been completely remodelled.—Micrometers have been placed in the microscopes for viewing the top and bottom of the plumbline: the original telescope-micrometer has been discarded, and a new one mounted, requiring only a small range of screw, and liable to none of the flexures to which the old one was exposed.

Mr. Airy having understood that Mr. Maclear, astronomer at the Cape of Good Hope, had with great care ascertained the precise locality of the Abbé de la Caille's observatory, and had taken measures for connecting, by triangulation, that spot with the new observatory, he

ventured to suggest to the Lords Commissioners of the Admiralty the propriety of enabling Mr. Maclear to verify the astronomical part of the measure of the arc of meridian if he should think fit; and he pointed out Bradley's sector as an instrument which, with a change in its mounting, would be well adapted to this purpose. Their Lordships were pleased to direct that the necessary change should be made; and that instrument is now in the hands of Mr. Simms for repair and alteration.

A valuable telescope of 6 $\frac{1}{2}$  inches aperture has been presented to the Royal Observatory by the Rev. R. Sheepshanks; and, with the approbation of the Board of Admiralty, Professor Airy has taken measures for mounting it equatorially in the South Dome; a situation greatly preferable to those of the existing equatorials. The artist employed in constructing the mounting is Mr. Thomas Grubb, of Dublin.

The observations of 1836, with the exception of some small matters, relating to the equatorial observations and the solar eclipse, are entirely reduced and ready for press. Of the results, the following are the most interesting. The circles exhibit precisely the same kind of discordance between determinations by direct visions and determinations by reflection, which was formerly noticed by Mr. Pond, afterwards by Professor Airy, and more lately by Mr. Henderson and Mr. Maclear; and its quantity is nearly the same. Correcting for this, and using Bessel's refractions, the Professor finds from more than 1300 observations that Mr. Pond's latitude requires to be diminished by nearly one second. The accurate agreement of the results from stars in different zones seems to show that Bessel's tables represent the Greenwich observations well. The discordance of the obliquities deduced from the two solstices is a very small fraction of a second. The right ascensions of the Nautical Almanac require to be diminished generally about 0. 13. The result of the reduced observations of a Lyra is not yet wholly investigated, but they appear to show no signs of sensible parallax.

Complaint, we find, is made of a want of hands to reduce the astronomical observations made in a satisfactory manner; or, to speak more properly, of much of the time of the present assistants being wasted upon business not strictly within their line of duty, namely, the daily comparison and official work relating to the government chronometers. Either the establishment should be increased, or the charge of the chronometers transferred to some other department.—*London Mechanics Mag.*

## TEMPORARY CAISSON FOR STOPPING OUT WATER WHILE REPAIRING SEA-COCKS OF STEAM-VESSELS.

(From the Nautical Magazine.)

The following description of a temporary caisson, applied to H. M. steam-vessel Dee, for the purpose of excluding

the water whilst one of the sea-cocks was ground in afresh, by Com. W. Ramsay, R. M., displays that ingenuity under difficulty, for which our seamen are celebrated:—

In describing a caisson that was used by H. M. steam-vessel Dee, under my command at Port Royal, in the month of August, 1835, the simplicity of the details are such, that it may perhaps be thought by some hardly worthy the attention of the readers of the Nautical; but as all who may have to encounter a similar difficulty may not know how easily it can be overcome, is a sufficient reason for giving them. It is necessary first to state, for the information of those who are not much acquainted with the fittings of steam-vessels, that there are several sea-cocks, which, when turned, admit the water through the bottom of the vessel for various well-known purposes. The most common plan is to have a pipe which communicates with the sea. About a foot from the outside of the vessel is the neck, upon which another pipe is fixed, which conveys the water to its destination. Now these cocks, by constant use, are liable to leak; when this occurs, the water flows in a stream into the vessel, and the only remedy to be applied is to remove the cock, and what is technically called, grind it in afresh, and then replace it. This is, of course, effected without danger when the vessel is in dock; but, it is evident, that if attempted when she is afloat, without some method of preventing the water rushing in, if the pipe inside cannot be stopped, which would be very doubtful, the vessel would fill with water.

This being premised, it may now be stated that the sea-cock on the larboard side of H. M. steam-vessel Dee was found to be leaking very much. It was considered that taking off the cock, and trusting to being able to stop the pipe from inside would be dangerous, besides the difficulty, perhaps impossibility, of putting the cock on again when reground, with such a rush of water as it is evident would take place. As there are no locks at Port Royal, the only plan was to stop the aperture (by which the water enters the vessel) outside, until the necessary repairs were completed.

The vessel was first given as a great heel as possible to starboard, by which the hole to be stopped was brought within four feet of the water's edge; next, having procured several feet of two inch fir plank, a box was made which had three sides, and a bottom, of the following dimensions: the back was five feet deep by four broad, the sides three feet broad, the bottom of course extending from the back to the ends of the sides. The way in which it was rendered watertight was this: two folds of very thick fear-nought boiled in a mixture of tallow and tar, was placed between each joining of the planks, and the whole was kept together by the means of iron bolts, which were driven quite through.



Now, it was necessary to obtain the exact curve of the vessel's bottom, that the sides of the caisson might be cut to answer to it. This was effected by means of a long stripe of lead, which was forced during a calm against the vessel's bottom. The curve being thus obtained, the sides and bottom of the caisson were cut to their proper shapes; small grooves were cut in their edges, and four folds of fear-rought, prepared as above were nailed on. The nails were driven along the grooves, so that when the caisson came to be pressed against the vessel's bottom, there might be nothing to prevent a good fit. Two large cleats were then nailed upon the vessel's side, on the exact spot that the top of the caisson would be, so that once forced down into its place, it could not rise again. As near the surface of the water as possible, two strong screw eye-bolts were fixed to the vessel's side, through which lashings were rove, and a tackle got all ready.

The caisson was now put over, forced down under the cleats mentioned above, the lashings encompassed it, which were hauled tight by the tackle, by which means the caisson was forced against the vessel. A small pump that had been prepared before, was then placed in it, by the aid of which, and bailing, all the water was got out of the caisson in about ten minutes, after which one man occasionally bailing kept it quite dry. Having this to work in, the aperture was soon secured, the cock taken off and ground afresh. When that was finished and put in again, the caisson, which had been allowed to fill with water was pumped out, the lead and plank had been nailed on to keep the water out of the ship, was taken off, and the whole business was finished without the slightest stop, impediment, or difficulty, in about forty-eight hours.

#### MR. CROSS'S EXPERIMENTS.

Mr. Cross has lately written to M. Becquerel that, among a variety of other things, he has succeeded in forming an entirely new substance, which crystallizes in needles, composed of a strong proportion of sulphur, and a small one of lead, of copper, and zinc. In the beginning of its formation it is of a magnificent crimson colour, which afterward changes to a brilliant scarlet, with an orange colour. The process of procuring it is thus:—An earthen pan is filled with hydro-sulphur of potass, and put in a glass vase, which is filled with a solution of sulphate of zinc. Afterwards is taken a small bow of lead and copper; the lead is plunged in hydro-sulphur of potass; the copper in sulphate of zinc. A copper wire, sufficiently bent, is then plunged in the two solutions, one end in the alkaline sulphur, the other in the sulphate of zinc. Some brilliant red crystals, in the shape of needles, issuing from a common centre, then envelope the extremity of the copper wire in the alkaline solution. This substance expe-

riences no action in muriatic acid, but it then becomes very black. Adding some drops of nitric acid, it is decomposed, and floats, in great part, at the surface; it is then pure sulphur. The remainder contains only lead, copper, and zinc, in small proportions. Mr. Cross writes, that since forming the substance, he had had too little time to examine it, otherwise than with great rapidity.

Among the substances sent to M. Becquerel there were, 1st, some beautiful crystals formed on the positive end of a copper wire, and, on the negative, crystals of sulphur: the solution employed was not mentioned; 2d, some per-oxide of granulous iron (fer mameionné) on copper, surrounded with a morsel of specular iron, in relation with the negative pole, the liquid employed being a solution of proto-sulphate of iron: also some gold formed *en dendrites* at the negative pole, in a solution of gold, on some clay, slightly hardened by fire.—*Railway Mag.*

#### RUSSIAN GOLD MINES.—IMPORTANT DISCOVERY.

The St. Petersburg letters are much occupied with a discovery relative to the working of the Russian gold mines, which, if truly stated, may come to have some influence on the circulation of the precious metals. A letter of the 26th ult. says, "There has been found out, it is said, in the Ural Mountains, a new mode of extracting gold from the earth, sand, or ore. The sand or earth has been put into a blast furnace and melted, and the most extraordinary results obtained. By washing, the method hitherto pursued in Russia, if one and a half zolotnicks of gold were produced from 100 poods of sand, &c., the expenses were about covered; two zolotnicks per 100 poods were worth working. Fine sand or earth rarely produced more than three zolotnicks, and five zolotnicks were quite uncommon. By the new process, on 100 poods of melted, they obtained sixty zolotnicks in some cases, in others forty to fifty zolotnicks; and on melting 100 poods of previously washed sand, they got forty to fifty zolotnicks of gold. There is little doubt of the accuracy of these statements, but what the comparative expense of the two modes is, I cannot tell you, nor whether the Ural grows sufficient wood for fuel, and whether coal can be found there. One pound Russian contains ninety-six zolotnicks; 100 poods are about 3550 lbs. English weight."—*Times.*

#### ANOTHER RUPTURE IN THE THAMES TUNNEL.

Yesterday afternoon the Thames Tunnel became quite filled with water which flowed from an aperture from above. It would appear from the report supplied to us on the subject, that generally there existed some necessity for keeping the pumps at work, for we understand, that a little before twelve o'clock at noon the water was found to increase considerably,

but in the course of the afternoon the quantity had somewhat diminished, although it slowly gained upon the pumps, and as the tide rose it was found impossible to keep pace with the increased influx of water, when Mr. Page, the acting engineer, considered it necessary to send for Mr. Brunel, who was in town attending a meeting of the directors.

At five o'clock, finding it was quite useless to proceed in the attempt to check the steady increase of the water, which had risen ten feet, the attention of the engineers and workmen was turned to securing all parts of the shield, which operation was carefully and deliberately performed. The curiosity of the men, who were anxious to watch the gradual rise of the water, rendered it very difficult for the engineer to withdraw them, even when it became expedient to do so. At half past five o'clock the Tunnel was filled, every one having previously retired, and it is gratifying to add, that no accident has occurred to any individual. Soundings were immediately taken by the engineer, and the displacement of ground having been ascertained to be of limited extent, steps were taken forthwith to stop the aperture from above, as upon former occasions, in order to resume the pumping as soon as possible.—*Times.*

#### PAPER CASTS OF SCULPTURE.

My servants made me casts in paper of the sculpture on the walls of these two rooms, that is, of all the sculpture in the three large plates which I now publish. This method of obtaining fac-similes of sculpture in basso-relievo is very successful, and so easy, that I had no difficulty in teaching it to my Arabs. I found stiff, unsized, common white paper to be best adapted for the purpose. It should be well damped, and, when applied to sculpture still retaining its color, not to injure the latter, care should be taken that the side of the paper placed on the figures be dry—that it be not the side which has been sponged. The paper, when applied to the sculpture, should be evenly patted with a napkin folded rather stiffly; and, if any part of the figures or hieroglyphics be in antaglio or elaborately worked, it is better to press the paper over that part with the fingers. Five minutes is quite sufficient to make a cast of this description. When taken off the wall it should be laid on the ground or sand to dry. I possess many hundred casts, which my Arabs made for me at Thebes and in the Oasis. Indeed, I very rarely made any drawings of sculpture without having a cast of the same; and as the latter are how quite fresh as on the day they were taken, the engraver having not only my drawing but also these indubitable fac-similes, is enabled to make my plates exactly like, and quite equal to the original.—*Hosking's Visit to the Oasis.*

#### PERCUSSION TUBES FOR CANNON.

Mr. J. Marsh has made a considerable improvement in the percussion tubes



used for cannon by the employment of a crow or other small quill, instead of a metal tube, which bursts without any danger from the fragments. Several thousand rounds have been fired on board the *Excellent* at Portsmouth without a single miss, and the Board of Ordnance have ordered 1,000 guns to be fitted with percussion locks. Mr. M has also improved the fulminating powder by adding to the sulphate of antimony and chlorate of potash a determinate portion of powdered glass, which, by increasing the friction, renders the explosion more certain and instantaneous. The Society of Arts have awarded to Mr. Marsh their silver medal.

#### BRIDGE OR TUNNEL FROM DOVER TO CALAIS

Mr. Coppett, an English engineer, is now on his road to Paris to lay before the French government a project for constructing a passage to cross dryshod from Calais to Dover. He at Havre explained his plan to the public. Mr. Coppett asks of France only one milliard, and as much from England. With this trifling sum, he will make cones like those employed at Cherbourg between fifty and sixty years ago. If the government does not approve of this system, he has in his pocket three or four others. For instance, he will make a tunnel under the sea from Dover to Calais, introducing from one end to the other cast-iron pipes 18 feet in diameter. This last mode of communication, according to Mr. Coppett, would cost only one milliard, to be paid in equal portions by both countries.—*Daily Paper*.

#### FILTERING MACHINES AND INFERNAL MACHINES.

A Frenchman, of the name of Alleunie, has lately got into a pretty scrape by the ignorance of the Belgian police upon scientific matters. It appears that he invented a machine for filtering and clarifying water, which he took with him from Paris to Brussels for the purpose of procuring a patent. The police, however, mistaking his filtering, for an infernal machine, he was arrested and thrown into prison, as a conspirator either against the French or Belgian king. After a confinement of two months, he was acquitted, but interdicted from France, and ordered on board a vessel for England, where he arrived without money or friends. The Lord Mayor, to whom his case was made known, a few days ago, recommended him to represent his case to King Leopold, now in England.

#### GALVANIC TELEGRAPH.

The mode of making instantaneous communications by galvanic power has been put to the most decided test on the London and Birmingham Railway, under the direction of Professor Whetstone and Mr. Stephenson, the engineer. Four copper wires, acted upon each end of the line at pleasure, by the agency of very

simple galvanic communicators, have been laid down on the line of the railroad to the extent of 25 miles. They are enclosed in a strong covering of hemp, and each terminus is attached to a diagram, on which the twenty-four letters of the alphabet are engraved, in relative positions, with which the wires communicate, by the aid of moveable keys, and indicate the terms of the communication. The gentleman to whom we have referred, we believe, are fully satisfied that communications to almost any extent may thus be made instantaneously by the agency of galvanism.—*True Sun*.

#### GIGANTIC ROAD SCRAPER.

A machine has just been introduced for scraping macadamized roads, and is now in use in Hyde Park, where it appears to do its work much more effectually, and in much less time, than the large hoe hitherto used for this purpose. The main objections to it are its weight, and that it appears to be only applicable to roads in good order, having a perfectly even surface.—*Lon. Morning Herald*.

#### STREAM NAVIGATION OF THE JUMNA, INDIA.

The Agra Ukhar of February, states, that a measure had been determined on by the supreme government, which was calculated to give impulse to the already fast advancing prosperity of Agra, and the permanent steam navigation of the Jumna. With a view to that object, three iron steam-boats, of the utmost possible buoyancy, had been ordered from Mauleslay and Co., and would probably within a year be plying on the Jumna. It is added, that this, with the presence of the two boards now at Allahabad, and the influx of small capitalists, will give Agra an European population, and activity unsurpassed by those of any city in the Mofussil. Other measures for the improvement of local trade had been submitted to the local government, such as the erection of wharfs, marking the channel of the Jumna, &c.

#### STEAM-BOATS IN SWITZERLAND.

According to the accounts from Switzerland, several of the Cantonal Governments have determined to build steam-boats to run on their inland lakes. This plan will produce great advantages, by opening a more ready communication between Zurich, the Grisons, and Italy. When the boats intended to navigate the Lake of Geneva commence running, travellers may go from Geneva to Berne in one day.—*Gazette de France*.

#### A NEW LIGHT.

A chemist having found, after many experiments, that a void produced by electricity in a glass vessel became luminous, has, at last, succeeded in forming a long bottle, of 3 inches by 30, from which having exhausted the air, and otherwise acted upon it by a galvanic

battery, a light is now emitted, being hung up in his apartment, equally clear, but not so oppressive to the eyes, as that of the sun.—*French Paper*.

#### EFFECT OF CLIMATE AND CULTIVATION ON VEGETABLES.

The myrtle tree, which, with us, is a small shrub, grows in Van Dieman's Land to the height of 200 feet, and has a trunk from 30 to 40 feet in circumference. The wood resembles cedar. The Chinese have an art by which they are able to produce miniature pines, bearing a perfect resemblance to the gigantic specimens of America, and only five or six inches high.—*Lon. Mech. Mag.*

#### From the London Mechanics' Magazine CAOUTCHOUC ROOFS.

Sir,—As yours is a repository for many crude (as well as perfected) inventions, which may afterwards be the groundwork for others of the greatest value and importance to the public, I beg to request you will lay before your readers the following suggestion for a new application of caoutchouc or India-rubber.

I have long thought, that if the tops of houses could be flat, and have reservoirs of water upon them, that water might be made available as a supply for domestic purposes to every room in the house, and also that screw hose might be fixed thereto for the purpose of extinguishing any fire in the room where it originates on its first discovery. Hitherto, lead has appeared the most suitable material for roofs, but weight, price, and contraction by the heat of the sun have been great objections. May not India-rubber be advantageously substituted? If prepared in large sheets one-eighth or three-sixteenths of an inch in thickness, they might be laid on and afterwards the joinings made perfectly secure by the solution of caoutchouc; and in case of damage from any cause, it might easily be repaired by the same means. Some of your more scientific readers can give the necessary strength of wall and timber for bearing the various depths of water which might be required. I apprehend that in large buildings, such as the new Houses of Parliament, it would not only be advantageous as a preventive of fire, but also more economical.

Yours,

A CONSTANT READER—Z.

#### TURF FOR STEAMBOAT FUEL.

It is an interesting fact, that turf is now used as fuel on board the steamers plying between Limerick, Clare, and Kilrush. The Garryowen has made the passage between Kilrush and Limerick, fired with turf, in three hours and twenty minutes.—*Irish Paper*.

#### THE QUEEN'S NEW DESSERT SERVICE.

There has lately been exhibiting, at the Griffin warehouse, (late Weeks's Museum), Piccadilly, an elaborate spe-



men of skill and excellence in one of the foremost of British manufactures. It is a splendid dessert service of porcelain, made for her Majesty, by Messrs. Brameld, of the Rockingham Works, near Rotherham, Yorkshire, of British materials. The designs, which are original, are by Mr. Brameld; and the pictorial embellishments have been executed by the artists of the Rockingham works. It has taken five years to complete this extraordinary labour of British art, the charge for which is upwards of 3000 guineas. The service consists of 200 pieces, viz., 56 elevated vases, baskets, &c., and 12 dozen plates. The service, by its lightness and elegance, will relieve the massive gold plateau, candelabra, &c., which are used at the royal state dinners.

Subscribers who desire to be supplied with missing numbers, will do well to apply for them soon. We shall always take pleasure in furnishing them if we have them to spare.

Particular attention will be given to the procuring of all kinds of Instruments required by Engineers.—Orders must be accompanied with the necessary funds or city acceptances.

Volume Six will be completed as speedily as possible. The next, or Volume for 1838, will be published in a more convenient form for preservation.

### NEW ARRANGEMENT.

#### ROPE FOR INCLINED PLANES OF RAILROADS.

WE the subscribers have formed a co partnership under the style and firm of Folger & Coleman, for the manufacturing and selling of Ropes for inclined planes of railroads, and for other uses, offer to supply ropes for inclined planes, of any length required without splice, at short notice, the manufacturing of cordage, heretofore carried on by S. S. Durfee & Co., will be done by the new firm, the same superintendent and machinery are employed by the new firm that were employed by S. S. Durfee & Co. All orders will be properly attended to, and ropes will be shipped to any port in the United States.

12th month, 12th, 1836. Hudson, Columbia County, State of New-York.

ROBT. C. FOLGER.  
GEORGE COLEMAN.

### AMES' CELEBRATED SHOVELS, SPADES, &c.

200 dozens Ames' superior back-strap shovels.  
150 do. do. do. plain do.  
150 do. do. do. cast-steel Shovels & Spades  
150 do. do. do. Gold-mining Shovels  
00 do. do. do. plated Spades.  
50 do. do. do. socket Shovels and Spades  
Together with Pick Axes, Churn-Drills, and Crow Bars (steel pointed), manufactured from Salisbury refined iron—for sale by the manufacturing agents,

WITHERELL, AMES & CO.  
No. 2 Liberty street, New-York.

BACKUS, AMES & CO.  
No. 8 State street, Albany.

Also furnished to order, Shapes of every description, made from Salisbury refined Iron. v4-1f

**MACHINE WORKS OF ROGERS, KETCHUM AND GROSVENOR,** Paterson, New Jersey. The undersigned receive orders for the following articles, manufactured by them, of the most superior description in every particular. Their works being extensive, and the number of hands employed being large, they are enabled to execute both large and small orders with promptness and dispatch.

#### RAILROAD WORK.

Locomotive Steam-Engines and Tenders; Driving and other Locomotive Wheels, Axles, Springs and Flange Tires; Car Wheels of cast iron, from a variety of patterns, and Chills; Car Wheels of cast iron, with wrought Tires; Axles of best American refined iron; Springs; Boxes and Bolts for Cars.

**COTTON, WOOL, & FLAX MACHINERY,** Of all descriptions and of the most improved patterns, Style, and Workmanship.

Mill Gearing, and Millwright work generally; Hydraulic and other Presses; Press Screws; Calenders; Lathes and Tools of all kinds; Iron and Brass Castings of all descriptions.

**ROGERS, KETCHUM & GROSVENOR,** Paterson, N. J. or 60 Wall-st. New-York. 51tf

#### FRAME BRIDGES.

THE undersigned, General Agent of Col. S. H. LONG, to build Bridges, or vend the right to others to build on his Patent Plan, would respectfully inform Railroad and Bridge Corporations, that he is prepared to make contracts to build, and furnish all materials for superstructures of the kind, in any part of the United States, (Maryland excepted.)

Bridges on the above plan are to be seen at the following localities, viz. On the main road leading from Baltimore to Washington; two miles from the former place. Across the Motawamkeag river on the Military road in Maine. On the national road in Illinois, at sundry points. On the Baltimore and Susquehanna Railroad at three points. On the Hudson and Paterson Railroad in two places. On the Boston and Worcester Railroad, at several points. On the Boston and Providence Railroad, at sundry points. Across the Contoncook river at Henniker, N. H. Across the Souhegan river, at Milford, N. H. Across the Connecticut river, at Hancock, N. H. Across the Androscoggin river, at Turner Centre, Maine. Across the Kennebec river, at Waterville, Maine. Across the Genesee river, at Squakiehill, Mount Morris, N. Y. Across the White River, at Hartford, Vt. Across the Connecticut River at Lebanon, N. H. Across the mouth of the Broken Straw Creek, Penn. Across the mouth of the Catawagus Creek, N. Y. A Railroad Bridge diagonally across the Erie Canal, in the City of Rochester, N. Y. A Railroad Bridge at Upper Still Water, Orono, Maine. This Bridge is 500 feet in length; one of the spans is over 200 feet. It is probably the firmest wooden bridge ever built in America.

Notwithstanding his present engagements to build between twenty and thirty Railroad Bridges, and several common bridges, several of which are now in progress of construction, the subscriber will promptly attend to business of the kind to much greater extent and on liberal terms.

MOSES LONG,  
Rochester, Jan. 19th, 1837. 4-y

**STEPHENSON,**  
Builder of a superior style of Passenger Cars for Railroads,

No. 264 Elizabeth street, near Bleeker street, NEW-YORK.

RAILROAD COMPANIES would do well to examine these Cars; a specimen of which may be seen on the New-York and Harlem Railroad, now in operation.

**ROACH & WARNER,**  
Manufacturers of OPTICAL, MATHEMATICAL AND PHILOSOPHICAL INSTRUMENTS, 293 Broadway, New-York, will keep constantly on hand a large and general assortment of Instruments in their line.

Wholesale Dealers and Country Merchants supplied with SURVEYING COMPASSES, BAROMETERS, THERMOMETERS, &c. &c. of their own manufacture, warranted accurate, and at lower prices than can be had at any other establishment.

Instruments made to order and repaired. 1y-14

### RAILWAY IRON, LOCOMOTIVES, &c. &c.

THE subscribers offer the following articles for sale:—

Railway Iron, flat bars; with countersunk holes and mitred joints,

350 tons 2 by 1, 15 ft in length, weighing 4 lbs per ft

280 " 2 " 1, " " " " 3 1/2 " "

70 " 1 1/2 " 1, " " " " 3 " "

80 " 1 1/2 " 1, " " " " 1 1/2 " "

90 " 1 " 1, " " " " 7 " "

with Spikes and Splicing Plates adapted thereto. To be sold free of duty to State governments, or incorporated companies.

Orders for Pennsylvania Boiler Iron executed. Rail Road Car and Locomotive Engine Tires, wrought and turned or unturned, ready to be fitted on the wheels, viz 30, 33, 36, 42, 44, 54, and 60 inches diameter.

E. V. Patent Chain Cable Bolts for Railway Car axles, in lengths of 12 feet 6 inches, to 13 feet 2 1/2, 2 3/4, 3, 3 1/4, 3 1/2, and 5 1/2 inches diameter.

Chains for Inclined Planes, short and stay links, manufactured from the E. V. Cable Bolts, and proved at the greatest strain.

India Rubber Rope for Inclined Planes, made from New Zealand Wax.

Also, Patent Hemp Cordage for Inclined Planes, and Canal Towing Lines.

Patent Felt for placing between the iron chair and stone block of Edge Railways.

Every description of Railway Iron, as well as Locomotive Engines, imported at the shortest notice, by the agency of one of our partners, who resides in England for this purpose.

A highly respectable American Engineer resides in England for the purpose of inspecting all Locomotives, Machinery, Railway Iron, &c. ordered through us.

A. & G. RALSTEN & CO., Philadelphia, No. 4 South Front-st.

28 tf

ARCHIMEDES WORKS.

(100 North Moore-street, N.Y.)

THE undersigned beg leave to inform the proprietors of Rail Roads, that they are prepared to furnish all kinds of Machinery for Rail Roads, Locomotive Engines of any size, Car Wheels, such as are now in successful operation on the Camden and Amboy Rail Road, none of which have failed.—Castings of all kinds, Wheels, Axles and Boxes, furnished at the shortest notice.

H. R. DUNHAM & CO.  
NEW YORK, February 12th, 1836. 4-ytf

### PATENT RAILROAD, SHIP AND BOAT SPIKES.

The Troy Iron and Nail Factory keeps constantly for sale a very extensive assortment of Wrought Spikes and Nails, from 3 to 10 inches, manufactured by the subscriber's Patent Machinery, which after five years successful operation, and now almost universal use in the United States, (as well as England, where the subscriber obtained a patent) are found superior to any yet ever offered in market.

Railroad companies may be supplied with Spikes having countersink heads suitable to the holes in iron rails, to any amount and on short notice. Almost all the Railroads now in progress in the United States are fastened with Spikes made at the above-named factory—for which purpose they are found invaluable, as their adhesion is more than double any common Spikes made by the hammer.

All orders directed to the Agent, Troy, N.Y. will be punctually attended to.

HENRY BURDEN, Agent.  
Troy, N.Y., July, 1831.

Spikes are kept for sale, at factory prices, by 1 & J. Townsend, Albany, and the principal Iron Merchants in Albany and Troy; J. T. Brower, 223 Water-street, New-York; A. M. Jones, Philadelphia; T. Janviers, Baltimore; Degrand & Smith, Boston.

P. S.—Railroad companies would do well to forward their orders as early as practicable, as the subscriber is desirous of extending the manufacturing so as to keep pace with the daily increasing demand for his Spikes.

1123am done none but H. BURDEN

G. Mitchell, Printer, 265 Bowery, N.Y.